

What is claimed is:

1. A guide assembly for reducing lateral movement of a storage tape in a tape drive, the guide assembly comprising:

5 a first roller including a perimeter surface, a circumference, a longitudinal axis and a groove disposed into the perimeter surface, the groove having a groove length that is less than the circumference.

10 2. The guide assembly of claim 1 wherein the first roller includes a plurality of spaced-apart grooves, each of the grooves having a groove length that is less than the circumference.

15 3. The guide assembly of claim 2 wherein the grooves are aligned substantially parallel to the circumference.

4. The guide assembly of claim 3 wherein the grooves are semi-randomly distributed on the perimeter surface.

20 5. The guide assembly of claim 2 wherein the groove length for at least one of the grooves is between approximately 0.1 percent (0.1%) and ninety percent (90%) of the circumference.

25 6. The guide assembly of claim 2 wherein the groove length for at least one of the grooves is between approximately one percent (1%) and fifty percent (50%) of the circumference.

7. The guide assembly of claim 2 wherein the groove length of at least one of the grooves is between approximately 0.01 inches and 1.5 inches.

30 8. The guide assembly of claim 2 wherein the percentage of the perimeter surface onto which grooves are disposed is in the range of between approximately one percent (1%) and forty percent (40%).

9. The guide assembly of claim 2 wherein the percentage of the perimeter surface onto which grooves are disposed is in the range of between approximately one percent (1%) and twenty-five percent (25%).

5 10. The guide assembly of claim 1 further including a roller mount, wherein the roller is rotatably mounted on the roller mount approximately on at least a portion of the longitudinal axis of the first roller.

10 11. The guide assembly of claim 1 wherein at least one of the grooves has a groove depth that varies between approximately zero inches and 0.02 inches along the length of each groove.

15 12. The guide assembly of claim 1 further comprising a second roller including a perimeter surface, a circumference, a longitudinal axis and a groove disposed into the perimeter surface, the groove having a groove length that is less than the circumference.

20 13. A tape drive including the guide assembly of claim 1, a take-up reel and a head assembly.

14. A guide assembly for reducing lateral movement of a magnetic tape in a tape drive, the guide assembly comprising:

25 a first roller including a perimeter surface, a circumference, a longitudinal axis and a groove disposed into the perimeter surface, the groove having a groove depth that varies along the length of the groove.

30 15. The guide assembly of claim 14 wherein the first roller includes a plurality of spaced-apart grooves, each of the grooves having a groove depth that varies along the length of the groove.

16. The guide assembly of claim 15 wherein the groove length of at least one of the grooves is between approximately 0.1 percent (0.1%) and ninety percent (90%) of the circumference.

17. The guide assembly of claim 15 wherein the groove length of at least one of the grooves is between approximately one percent (1%) and fifty percent (50%) of the circumference.

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18. The guide assembly of claim 15 wherein the percentage of the perimeter surface onto which grooves are disposed is in the range of between one percent (1%) and forty percent (40%).

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19. The guide assembly of claim 15 wherein the percentage of the perimeter surface onto which grooves are disposed is in the range of between one percent (1%) and twenty-five percent (25%).

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20. The guide assembly of claim 15 wherein each of the grooves is aligned substantially parallel to the circumference.

21. The guide assembly of claim 15 wherein the grooves are semi-randomly distributed on the perimeter surface.

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22. The guide assembly of claim 14 further comprising a second roller including a perimeter surface, a circumference, a longitudinal axis and a groove disposed into the perimeter surface, the groove having a groove depth that varies along the length of the groove.

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23. The guide assembly of claim 14 wherein the groove depth varies between approximately zero inches and 0.05 inches.

24. A tape drive including the guide assembly of claim 14 and a take-up reel and a head assembly.

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25. A guide assembly for reducing lateral movement of a magnetic tape of a tape drive, the guide assembly comprising:

a first roller having a perimeter surface, a circumference and a plurality of spaced-apart discontinuous grooves disposed into the perimeter surface, each groove being positioned substantially parallel to the circumference of the roller, each groove having (i) a groove depth that varies between approximately zero inches and 0.02 inches, (ii) a groove length of between approximately 0.1 inches and 0.3 inches, and (iii) a groove width of between approximately 0.005 inches and 0.015 inches.

26. A method of manufacturing a tape roller of a guide assembly for a tape drive, the method comprising the steps of:

providing a roller portion having a circumference and a perimeter surface; and

forming a groove into the perimeter surface so that the groove has a groove length that is less than the circumference.

27. The method of claim 26 wherein the step of forming a groove includes forming a plurality of spaced-apart grooves into the perimeter surface so that each groove has a groove length that is less than the circumference.

28. A method of manufacturing a roller for use in a guide assembly of a tape drive, the method comprising the steps of:

providing a roller portion having a circumference and a perimeter surface; and

forming a groove into the perimeter surface so that the groove has a groove depth that varies along the length of the groove.

29. The method of claim 28 wherein the step of forming a groove includes forming a plurality of spaced-apart grooves into the perimeter surface so each groove has a groove depth that varies along the length of the groove.

30. A method of reducing lateral tape motion of a storage tape adapted for use in a tape drive, the method comprising the steps of:

providing a tape drive having a guide assembly that includes a first roller having a perimeter surface, a circumference, and a groove disposed into the perimeter surface, the groove having a groove length that is less than the circumference.

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31. The method of claim 30 including the step of rotatably mounting the first roller on a roller mount so that the storage tape passes over at least a portion of the perimeter surface of the first roller during operation of the tape drive.

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32. The method of claim 31 including the step of providing a second roller having a perimeter surface, a circumference, and a groove disposed into the perimeter surface, the groove having a groove length that is less than the circumference; wherein the storage tape passes over at least a portion of the perimeter surface of the second roller during operation of the tape drive.

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